

Memory Cards



Digital cameras are supplied with a paltry amount of memory, so a new memory card is usually an essential purchase. We've tested 18 512MB cards in three different formats to find the best performers

One of the best things about digital cameras is that their memory cards can be reused again and again. One of the worst things is that manufacturers often supply just 32MB or even less memory as standard. With each picture consuming between one and three megabytes of storage space, that is clearly nowhere near enough.

Fortunately, 512MB memory cards are now available from as little as £19 including VAT. If you've been getting by with 128MB or less, now is the perfect time to upgrade. You can forget about having to reduce quality settings to fit more pictures in your camera, and there'll be no more dilemmas about which photos to delete to make room for your new ones. You'll even be able to use your camera's video function for more than 10 seconds.

Memory cards aren't just for digital cameras, though. You can use them in PDAs, mobile phones, MP3 players and portable games consoles. You could even use them to transfer files between computers, a job for which their size, capacity, price and robustness make them perfect. So whether you have £9 or £119 to spend, we're here to help you find the perfect memory card upgrade.



CHOOSING... MEMORY CARDS

Your first task is to work out which type of memory you need – you should find your device's card slot is clearly labelled. Secure Digital, or SD, is the most common memory card standard, while xD-Picture Card is used in FujiFilm and Olympus cameras, and Sony devices use Memory Stick. Some Memory Sticks have a 'Pro' suffix, which allows capacities of up to 2GB (the non-Pro cards are limited to 128MB). Memory Stick Pro will work only in more recent devices, so check before you buy.

Sony's latest format is Memory Stick Duo. Available in standard and Pro versions, these are more compact than normal Memory Sticks, although cheap adaptors are available that turn them into regular Memory Sticks. There are also smaller versions of the SD format – called Mini-SD and Transflash – both of which can be put into adaptors and used in normal SD slots.

Older formats such as SmartMedia, MMC and CompactFlash are less common now, although the latter is still used in professional digital cameras, as the format's bulky dimensions are offset by capacities of up to 8GB and low prices per megabyte.

To test whether cards' write speeds affected how fast cameras could take shots, we set various cameras to continuous mode and timed how long it took to capture a set number of photos. Of all the cameras we used in the test, only the most expensive – a Nikon D50 digital SLR – was affected by the choice of card. With all the others, the camera wasn't able to process images to JPEG format fast enough to tax even the slowest memory card's performance.

We also timed how long it took to view a fixed number of pictures in a variety of cameras. Here we found that the choice of memory card made no difference in any of the cameras.

IN THIS REVIEW

SD CARDS

Crucial Secure Digital
FujiFilm SecureDigital 133x
FujiFilm SecureDigital 60x
Integral Hi-Speed SD
Integral SD
Kingston Elite Pro Hi-Speed Secure Digital
Kingston Secure Digital
Lexar Platinum SD 40x
My Media Secure Digital
PNY High Speed SD Secure Digital 133X
SanDisk Standard SD
SanDisk Ultra II SD

MEMORY STICK CARDS

Lexar Memory Stick Pro Duo Game Edition
SanDisk Gaming Memory Stick PRO Duo
Sony Memory Stick Pro Duo

xD CARDS

FujiFilm xD-Picture Card
Olympus Type M xD-Picture Card
Olympus xD-Picture Card

CAPACITY

Most people find that 512MB is ideal as it is enough for hundreds of photos and costs between £20 and £35. However, if you want to shoot video or play music or videos on a PDA or portable player, consider getting a 1GB or 2GB card.

A larger-capacity card will probably result in more files to store on your hard disk. Memory cards may be reusable, but your photo collection can quickly run into tens of gigabytes if you're taking lots of photos on a weekly basis. If you're thinking of getting a large memory card, also consider buying a dedicated hard disk to archive your files.

SPEED

We like our kit to work as quickly as possible, but speed is only desirable if there's a practical benefit. Our tests show that very few cameras perform differently depending on the speed of memory card used, and even transfers to the PC over your camera's USB cable are often limited by the camera rather than the media. If your camera or portable device is painfully slow to transfer files, consider getting a USB Hi-Speed card reader to make the most of your new memory card's performance.

HOW WE TESTED

We performed a number of timed tests to ascertain the performance of each card. We copied a 450MB folder of 192 photos to and from the cards using a SanDisk USB Hi-Speed card reader. Each test was performed twice to ensure accuracy, and repeated again if the first two results didn't match. We also timed how long it took to delete the folder from each card.

To see how these basic performance figures translated into typical use with a digital camera, we copied the same 450MB folder to and from the fastest and slowest SD cards, this time using a range of digital cameras connected to the PC via USB.



SD CARDS

MANUFACTURER	CRUCIAL	INTEGRAL	INTEGRAL 	FUJIFILM	FUJIFILM	KINGSTON
Model	Secure Digital	Secure Digital	Hi-Speed SD	SecureDigital 60x	SecureDigital 133x	Secure Digital
Rating	★★★★★	★★★	★★★★★	★★★	★★	★★★★★
Pros	Fast to read and delete files; low price	Low price, especially for 1GB card	Fastest read speed; low price	Reasonable performance and price	Excellent performance	Low price
Cons	Write speed is only average	Poor write performance	Slow to delete files	Cheaper cards perform better	Overpriced	Basic performance
Format	Secure Digital	Secure Digital	Secure Digital	Secure Digital	Secure Digital	Secure Digital
Quoted speed	Not stated	Not stated	66x	60x	133x	33x
Other capacities (prices inc VAT)	128MB £9, 256MB £14, 1GB £43, 2GB £98	128MB £9, 256MB £13, 1GB £38	1GB £44	256MB £18, 1GB £48	1GB £90	128MB £9, 256MB £12, 1GB £41
Price inc VAT	£22	£22	£24	£28	£42	£19
Warranty	Lifetime	Five years	Five years	Lifetime	Lifetime	Lifetime
Supplier	www.crucial.com/uk	www.misco.co.uk	www.misco.co.uk	www.morecomputers.co.uk	www.morecomputers.co.uk	www.mymemory.co.uk
Details	www.crucial.com/uk	www.integralmemory.com	www.integralmemory.com	www.fujifilm.co.uk/media	www.fujifilm.co.uk/media	www.kingston.com/ukroot
Part code	CT512MBSD	72-65-09	35-78-82	N076390A	N076410A	SD/512
						

MANUFACTURER	KINGSTON	LEXAR	MY MEDIA	PNY	SANDISK	SANDISK
Model	Elite Pro Hi-Speed Secure Digital	Platinum SD 40x	Secure Digital	High Speed SD Secure Digital 133X	Standard SD	Ultra II SD
Rating	★★★★★	★★★	★★	★★★★★	★★	★★★
Pros	Solid performance; competitive price	Fastest to delete files	Excellent performance	Fastest write speed; excellent read speed	Decent read speed	Solid performance
Cons	Integral Hi-Speed card outperforms it	Below-average read speed	Overpriced	Mediocre delete speed	Poor write and delete speed	Cheaper cards perform better
Format	Secure Digital	Secure Digital	Secure Digital	Secure Digital	Secure Digital	Secure Digital
Quoted speed	50x	40x	Not stated	133x	Not stated	60x
Other capacities (prices inc VAT)	1GB £41	1GB £53	128MB £15, 256MB £25, 1GB £80	1GB £54, 2GB £95	128MB £9, 256MB £18, 1GB £42	1GB £54, 2GB £110
Price inc VAT	£25	£29	£45	£29	£26	£33
Warranty	Lifetime	Lifetime	Five years	Two years	Five years	Ten years
Supplier	www.savastore.com	www.eclipsecomputers.com	Tesco stores	www.misco.co.uk	www.digital-cameras.com	www.mymemory.co.uk
Details	www.kingston.com/ukroot	www.lexar.com	www.mymediacards.co.uk	www.pny-europe.com	www.sandisk.com	www.sandisk.com
Part code	SD/512-S	SD512-40-266	N/A	P-SD512HS2-BX	SDSDB-512-A10	SDSDH-512-902
						

MS CARDS

MANUFACTURER	LEXAR	SANDISK	SONY	FUJIFILM	OLYMPUS	OLYMPUS
Model	Memory Stick Pro Duo Game Edition	Gaming Memory Stick PRO Duo	Memory Stick Pro Duo	xD-Picture Card	xD-Picture Card	Type M xD-Picture Card
Rating	★★★	★★★★★	★★★	★★★	★★	★
Pros	Fast write performance	Fast to read and delete files	Reasonable performance	Decent price and performance for an xD card	Passable read performance	Available in 1GB capacity
Cons	Below-average read performance	Below-average write performance	Erratic write performance	Performs badly compared to other media types	Slow; expensive	Slow; expensive
Format	Memory Stick Pro Duo	Memory Stick Pro Duo	Memory Stick Pro Duo	xD-Picture Card	xD-Picture Card	xD-Picture Card
Quoted speed	40x	Not stated	Not stated	Not stated	Not stated	Not stated
Other capacities (prices inc VAT)	256MB £21, 1GB £53	128MB £10, 256MB £18, 1GB £52	256MB £24, 1GB £60, 2GB £119	128MB £10	128MB £13, 256MB £22	256MB £30, 1GB £74
Price inc VAT	£32	£35	£35	£29	£36	£38
Warranty	Lifetime	Five years	Five years	Five years	Two years	One year
Supplier	www.savastore.com	www.mymemory.co.uk	www.dabs.com	www.savastore.com	www.dabs.com	www.crucial.com/uk
Details	www.lexar.com	www.sandisk.com	www.sony.co.uk	www.fujifilm.co.uk/media	www.olympus-europa.com	www.olympus-europa.com
Part code	MSDP512-40-653	SDMSG-512-E17	MSX-M512S	N073940A	M-XD512P	200395P
						

xD CARDS



BENCHMARKS

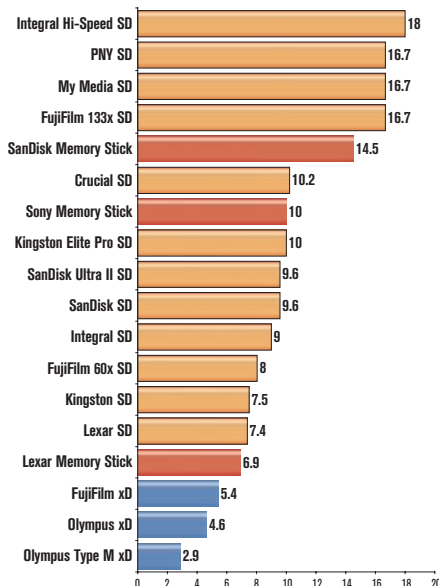
SD cards

MS cards

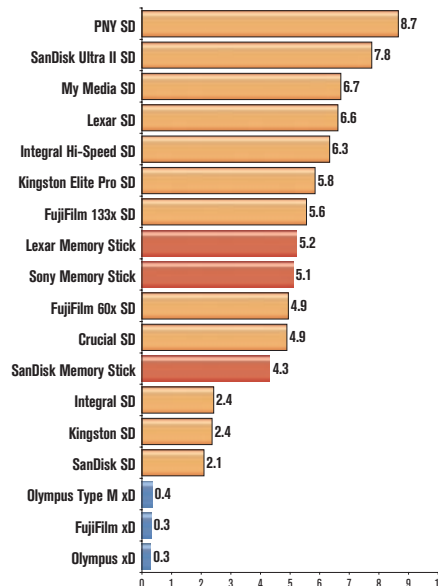
xD cards

Performance Data transfer rates

Read in USB card reader (MB/s)



Write in USB card reader (MB/s)



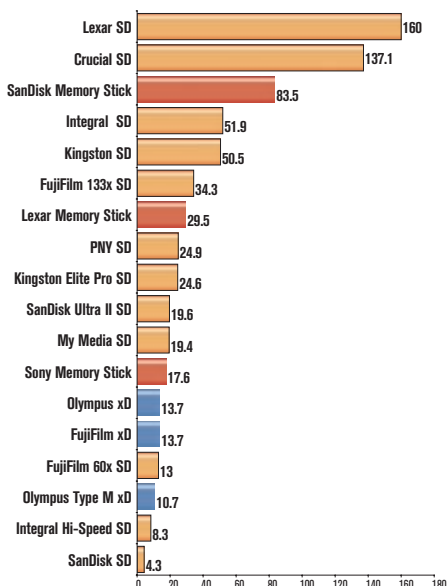
Copying files to and from a memory card using a USB card reader is a common task, and it's also a good measure of the card's performance. The more expensive SD cards tend to perform better, but there are exceptions; the Integral Hi-Speed SD costs just £25 but has the fastest read speed of any card here. The Memory Stick Duo cards hold their

own compared to the SD cards, but the xD cards trail far behind, especially for write speeds.

To check the results, we retested the xD cards in a Trust USB card reader and an Olympus SP-350 camera. Although write speeds increased to nearer 1MB/s, read speeds fell even further to around 4MB/s in the card reader and 2MB/s in the camera.

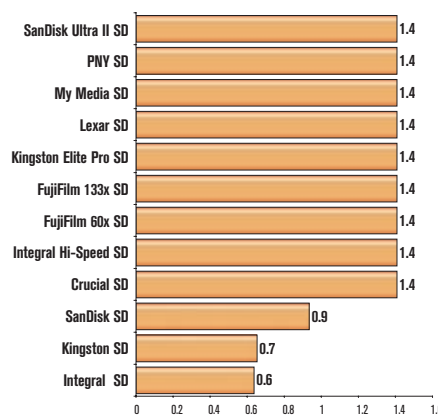
Performance Taking/deleting photos

Delete speed (file/s)



Delete speed is rarely considered when assessing a storage medium's performance, but we found this to vary greatly. The Crucial and Lexar SD cards took barely over a second to delete our folder of 192 photos, but most cards took around 10 seconds, and the SanDisk Standard SD Card took 45 seconds.

Continuous mode (shots/s)



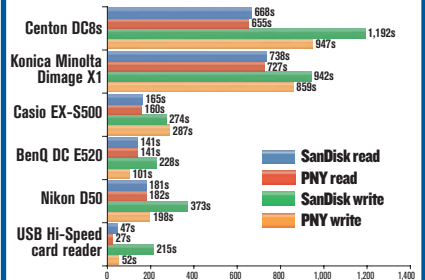
The Nikon D50 digital SLR can capture photos at a frame rate of 1.4 frames per second (fps), and with its top JPEG quality setting creating files of around 2.4MB, this results in a data rate of 3.4MB/s.

Most of the SD cards in our tests this month were fast enough to record this data, but it proved too much for Integral, Kingston and SanDisk's slower cards, all of which have a write speed of less than 2.5MB/s. However, even with these cards, the first 10 or so shots were captured at 1.4fps, as the camera was able to use its internal memory to buffer the data.

CAMERA TRANSFERS

Performance in a fast USB card reader won't necessarily translate to performance when accessing files directly from a digital camera, so we took the fastest (PNY) and slowest (SanDisk) SD cards from the card reader tests and tried them in a variety of cameras. Our results indicate that read speeds are usually dictated by the camera and the card's performance has little or no effect. However, even when the camera is creating a severe bottleneck to data transfer rates, a faster card can still improve writing performance. This is less useful in digital cameras where it's unlikely you'll want to copy files to the device, but could be handy for PDAs and portable music and media players.

450MB photos transfer time



LABS VERDICT MEMORY CARDS

You'll need a well-specified camera to benefit from a fast memory card while taking shots. However, faster cards can speed up the copying of files to and from the PC, so performance is still important.

The Memory Stick Duo cards gave reasonable performance, although prices are higher than for equivalent SD cards. The best of the three on test was SanDisk's Gaming Memory Stick PRO Duo, with its excellent file read and delete speeds. The xD-Picture Card format's performance lags considerably behind other formats, and it too costs more per megabyte compared to SD cards. However, FujiFilm's xD card gave the fastest read speed of the three we tested, and its price is the lowest, too.

Secure Digital cards are the most common type to be found in portable devices, and fortunately they're also the most affordable and best performing. Our Best Buy is Integral's Hi-Speed SD Card, which produced the fastest read speed in our tests yet costs just £24 for 512MB. The Crucial, PNY and Kingston Elite Pro cards are all close runners-up, each offering excellent performance for under £30.

SD CARD

INTEGRAL
Hi-Speed SD

